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MUSSEL BEDS OF THE CUMBERLAND RIVER IN 1911.[1]

As part of a series of such investigations by the Bureau of Fisheries, the mussel beds of the Cumberland River were examined in 1911 with reference to the quality and quantity of their yield of shells. For information of mussel fishermen, pearl-button manufacturers, and other persons especially interested in the subject the principal results of the examination are summarized in the following preliminary report.

LOCATION AND PRODUCTIVITY OF BEDS.

The Cumberland River rises in the extreme southeastern corner of Kentucky, flows westerly through portions of Kentucky and Tennessee, and empties into the Ohio at Smithland, Ky. It is navigable during high water from its mouth to Burnside, a distance of 525 miles, and a system of locks in process of construction will make navigation possible during the entire year.

Cumberland Falls, in Whitley County, Ky., form an impassable barrier for mussels and much of the other life in the river, and above the falls the ladyfinger (*Unio gibbosus*), which has no commercial value, is practically the only species. The lower river, from the pool at the foot of the falls to the mouth, abounds with mussels, as do all the tributaries. From Cumberland Falls to Celina, Tenn. (175 miles), mussels are fairly abundant and the beds are well distributed, but the percentage of unmerchantable shells, small species and "pinks," is too high, and there is no clamming for button-making purposes, though pearling is carried on in many places with good success. The best beds for commercial purposes are those at Indian Creek Bar, where the southern mucket is quite abundant; Selfs Bar,

[1] By Charles B. Wilson and H. Walton Clark, whose complete report will be published by the Bureau later.

from which several tons of shells have been taken by the pearlers; and Biggerstaff Bar, where there is a marked increase in merchantable species, notably the southern mucket, butterfly, three-ridge, and Ohio pig-toe.

In the second stretch of river, from Celina to Nashville, Tenn. (190 miles), more commercial shelling is carried on and not as much pearling. There are about 30 important beds of mussels distributed with considerable regularity in this portion of the river. About 3 miles below Butlers Landing, 7 tons of merchantable shells, mostly Ohio pig-toes and southern muckets, were collected a year or two ago and left on the river bank. At Dycus Landing clammers were at work in 1911, but had not collected enough shells to permit an estimate of their value. Below Carthage, at the foot of Goodalls Island, is a large bed of fine shells, upon which both clammers and pearlers were actively at work with fair results, and an Ohio River company is said to have taken 200 tons of good mussels from this locality. Half a mile below Cedar Bluffs 12 tons of shells were collected and cribbed a year ago, but were held for a higher market. There is also a fine bed at the head of Hills Island which has not been worked, at least not recently.

The third stretch of river, from Nashville to Dover, Tenn. (105 miles), has been thoroughly worked by clammers, and the location of all the beds, together with their size and relative value, are well known, largely because a factory for sawing blanks at Clarksville, Tenn., has furnished a ready market for the shells. The largest and most valuable bed of shells on the Cumberland is located at Gowers Island, 25 miles below Nashville. It is $3\frac{1}{2}$ or 4 miles in length and contains many fine niggerheads and yellow sand shells. Gaissers Bar, near Clarksville, has been worked for 10 years by from three to five boats, and was said to be as good as ever by clammers working on it in 1911. From the beds below Clarksville an enormous number of shells, estimated at 500 or 600 tons, have been taken during past years.

The remaining portion of the river from Dover to the Ohio (85 miles), while it has not been worked as much as the preceding portion, probably contains as many and as valuable mussels. There are numerous beds near Dover, Tenn., and at Linton, Donelsons Creek, Canton, and Kuttawa, all in Kentucky. In these beds there is a noticeable increase in the percentage of niggerheads, while the proportion of Ohio pig-toe remains about the same.

From Lock 21, situated 27 miles below Burnside, Ky., to Carthage, Tenn., a distance of 200 miles, the river is still in its natural state, abounding in riffles and shoals, and the current is strong enough to permit the use of brails in collecting mussels. Those por-

tions flooded by backwater from the locks have no current, and tongs are required, but the quiet water forms a favorable breeding place for mussels and the beds grow faster and thrive better than in a swift current. Unlike the upper Mississippi, there is little or no independent clamming on the Cumberland. In most cases the clammers do not own their outfits, but collect the mussels by contract for the person furnishing the boats.

On account of the high percentage of pink shells, clamming is not very profitable in the upper portion of the Cumberland, but if the southern mucket were artificially propagated there it would soon reduce this percentage and make the mussel beds commercially valuable.

THE IMPORTANT SHELLS.

Eighty-six species of mussels are now known from the Cumberland River, of which only about 17 can be used for button making, the rest being too small or too thin. Among these 17 there are but 5 really important species—the niggerhead, the Ohio River pig-toe, the southern mucket, the butterfly, and the yellow sand shell.

The niggerhead (*Quadrula ebena*) is the most important shell on the lower river, but the means of propagating it have not yet been discovered. It is doubtful whether it would succeed in any but the lower part of the river, as it requires rather deep water, and it has probably extended its range up the river as far and as abundantly as it found conditions favorable.

The Ohio River pig-toe (*Quadrula obliqua*) is the most common commercial shell in the central portion of the river. While a good button shell, it is considerably inferior to the niggerhead, and since better shells are easily procurable, this one would not make a particularly desirable species to propagate in the river unless the conditions were especially favorable.

The southern mucket (*Lampsilis ligamentinus gibbus*) is an unusually good button shell, fully equal to the best of the niggerheads. It is quite flat and uniform in thickness, so that there is little waste. It could be easily propagated, since it has a long breeding period, and the glochidia fasten themselves readily to sunfishes, perch, and bass. It will thrive also in a great variety of situations, so that, everything considered, it would be much superior to any other species for the restocking of the river.

The butterfly (*Plagiola securis*) is rather common throughout the whole length of the river. Near the mouth of the river the shells are badly stained, but above Canton, Ky., they have an excellent white nacre. The species reaches a large size in the Cumberland, and the sexes are strongly marked, the females being humped and

inflated. Next to the preceding species, this would be the most desirable to plant in the river, and it also has a long breeding season.

The yellow sand shell (*Lampsilis anodontoides*) which is the most valuable of fresh-water shells, occurs occasionally in the Cumberland, and was quite common at Meeks Spring Bar. These shells are generally exported to be manufactured into knife handles, etc., and are thus of interest to shippers rather than to local manufacturers.

The "washboard" also occurs in most of the mussel beds, but is usually badly stained, and its shells are always sorted separately and sold as second grade. It reaches a large size, but is not as immense as in the Wabash or Mississippi.

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